ABSTRACT

An improved, adaptive optics control system having a signal-to-noise ratio-tuned wavefront corrector is disclosed. The system comprises a wavefront corrector, a wavefront sensor, a wavefront reconstructor and a wavefront controller. The wavefront corrector has a surface controlled by a plurality of actuators. The wavefront slope sensor has a subaperture separation mechanism for defining a plurality of subapertures through which the distorted wavefront can pass, each subaperture corresponding to an actuator of the wavefront corrector. The wavefront slope sensor produces a wavefront sensor output signal for each subaperture indicative of the distortion of the wavefront. The wavefront reconstructor is adapted to receive the wavefront sensor output signals and calculate corresponding phase estimates based thereon, each phase estimate having a signal-to-noise ratio. The wavefront reconstructor generates a plurality of correction signals to be applied to each of the actuators of the wavefront corrector, each correction signal having a bandwidth. The wavefront controller is adapted to selectively adjust the bandwidth of each correction signal based on the signal-to-noise ratio of the corresponding phase estimate of the actuator to which it is to be applied. A method of optical wavefront distortion correction is also disclosed.